



2915796364US

Appendix A

(VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Please amend the Claims as follows:

WHAT IS CLAIMED IS:

1. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

an IP transfer network contains two, or more connection servers, and a media router outside said IP transfer network is connected to a terminal having a transmittance/reception function of digital media:

a call setting IP packet is transmitted from said media router to the connection servers:

said connection server provided on the telephone calling side determines both a communication line for an inter-terminal communication within said IP transfer network and a circuit identification code for identifying said communication line by employing both a telephone number provided on the telephone calling side and a telephone number provided on the call reception side, and produces an initial address message containing said circuit identification code:

said produced initial address message is transmitted to the connection server provided on the call reception side, said connection server on the call reception side transmits a call setting IP packet to the media router on the call reception side, and said media router on the call reception side transmits said call setting IP packet to the terminal on the call reception side:

\_\_\_\_\_ said connection server on the call reception side produces an address completion:

\_\_\_\_\_ said address completion message and transmits said received address completion message is transmitted to said connection server on the telephone calling side:

\_\_\_\_\_ when a report of telephone calling operation is received from the terminal on the call reception side, said connection server on the call reception side produces a call pass message: said call pass message reaches to said connection server on the telephone calling side: and said connection server on the calling side transmits the report of telephone calling operation of the terminal on the call reception side to the media router on the telephone calling side:

\_\_\_\_\_ upon receipt of a response issued from the terminal on the call reception side, said connection server on the call reception side produces a response message: said response message reaches to said connection server on the telephone calling side: said connection server on the telephone calling side stops the calling sound of the terminal on the call reception side: both said terminal on the telephone calling side and said terminal on the call reception side can establish an inter-terminal communication between the terminals to transmit/receive the digital media via said media routers provided on the telephone calling side and the call reception side:

a request for interrupting the inter-terminal communication is transmitted from said media router provided on either the telephone calling side or the call reception side to said connection server; a release request is sent from said connection server to another connection server; an interrupt instruction is transmitted from said another connection server to another media router, and on the other hand, a release completion is transmitted from another connection server via said relay connection server to said server; and an interrupt completion is sent to a media router so as to connect/release the inter-terminal communication between the two terminals.

1. ~~A terminal to terminal communication control method with employment of an IP transfer network, wherein:~~

~~an IP transfer network contains two, or more connection servers, and a media router outside said IP transfer network is connected to a terminal having a transmittance/reception function of digital media;~~

~~a call setting IP packet is transmitted from said media router to the connection servers;~~

~~said connection server provided on the telephone calling side determines both a communication line for an inter-terminal communication within said IP transfer network and a line number/circuit identification code for identifying said communication line by employing both a telephone number~~

~~provided on the telephone calling side and a telephone number provided on the call reception side, and produces an initial address message containing said line number~~circuit identification code;

~~—— said produced initial address message is transmitted to the connection server provided on the call reception side via a relay connection server, said connection server on the call reception side transmits a call setting IP packet to the media router on the call reception side, and said media router on the call reception side transmits said call setting IP packet to the terminal on the call reception side;~~

~~—— said connection server on the call reception side produces an address completion;~~

~~—— said address completion message and transmits said received address completion message is transmitted to said connection server on the telephone calling side via said relay connection server;~~

~~—— when a report of telephone calling operation is received from the terminal on the call reception side, said connection server on the call reception side produces a call pass message, said call pass message reaches via said relay connection server to said connection server on the telephone calling side, and said connection server on the calling side transmits the report of telephone calling operation of the terminal on the call reception side to the media router on the telephone calling~~

side;

~~— upon receipt of a response issued from the terminal on the call reception side, said connection server on the call reception side produces a response message; said response message reaches via said relay connection server to said connection server on the telephone calling side; said connection server on the telephone calling side stops the calling sound of the terminal on the call reception side; both said terminal on the telephone calling side and said terminal on the call reception side can establish an inter-terminal communication between the terminals to transmit/receive the digital media via said media routers provided on the telephone calling side and the call reception side;~~

~~— a request for interrupting the inter-terminal communication is transmitted from said media router provided on either the telephone calling side or the call reception side to said connection server; a release request is sent from said connection server to both said relay connection server and another connection server; an interrupt instruction is transmitted from said another connection server to another media router, and on the other hand, a release completion is transmitted from another connection server via said relay connection server to said server; and an interrupt completion is sent to a media router so as to connect/release the inter-terminal communication between the two terminals.~~

2. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein:

an initial address message, a call pass message, a response message, a release message, and a release completion message are transmitted/received between said connection server on the telephone calling side and said connection server on the call reception side, and an address completion message is omitted.

3. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein:

after the inter-terminal communication is completed, said connection server acquires an inter-terminal communication record including a line number~~circuit~~ identification code, a communication time instant, and a telephone number, and records the acquired communication record therein so as to be used for a charging purpose and an operation/management.

4. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein: said terminal is a telephone set, said digital media is digitalized voice and said media

communication is telephone communication.

5. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein: said terminal is an IP terminal, said digital media is characters or digitalized still images and said media communication is IP data communication.

6. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein: said terminal is a voice-moving image transmission/reception terminal, said digital media is digitalized voice-moving image and said media communication is voice-moving image communication.

7. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein: said terminal is a facsimile terminal, said digital media is digitalized facsimile image and said media communication is facsimile communication.

8. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein: said telephone number is terminal discrimination number to discriminate a receiving terminal.



9. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

while a destination multicast address is registered into an address administration table of a network node apparatus, in such a case that a destination multicast address contained in a header of an external IP packet entered into said network node apparatus is not registered in said address management table, said network node apparatus discards said external IP packet so as to avoid that an unexpected external IP packet is mixed into the IP transfer network.

10. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 9, wherein:

since registering of an address of a multicast transmitting person into an address administration table of a network node apparatus on the side of a receiving person is not allowed, an ACK packet for confirming the reception of said IP packet, which is directed from a multicast IP packet receiving person to a multicast IP packet transmitting person cannot pass through the network node apparatus.

11. A network node apparatus wherein:

while a destination multicast address is registered into an address administration table of a network node apparatus, in such a case that a destination multicast address contained in a header of an external IP packet entered into said network node apparatus is not registered in said address administration table, said network node apparatus discards said external IP packet so as to avoid that an unexpected external IP packet is mixed into the IP transfer network.

12. A network node apparatus wherein:

since registering of an address of a multicast transmitting person into an address administration table of a network node apparatus on the side of a receiving person is not allowed, an ACK packet for confirming the reception of said IP packet, which is directed from a multicast IP packet receiving person to a multicast IP packet transmitting person cannot pass through the network node apparatus.

13. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

when a network node apparatus detects an IP packet which a domain name server is a receiver IP address, the received IP packet is transferred to a domain name server only when a combination of sender IP address of said IP packet and a

communication line inputted said IP packet is included in an address administration table of said network node apparatus, thereby to register an allowance of inter-terminal communication.

14. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 2, wherein:

in order to perform a telephone communication between a first dependent type IP telephone set and a second dependent type IP telephone set, when a handset of said first dependent type IP telephone set is taken up, said first dependent type IP telephone set forms an IP packet containing the telephone number of said second dependent type IP telephone set, the IP packet reaches first network node via said first H323 termination unit and a first domain name server inside the first media router, the first network node apparatus sends said IP packet to a second domain name server inside an integrated IP transfer network, said second domain name server returns a second IP address corresponding to the telephone number of said second dependent type IP telephone set in an 1-to-1 correspondence relationship via said first domain name server or without passing through said first domain name server to said first H323 termination unit, when said first H323 termination unit forms and sends an IP packet with a destination

IP address as being said second IP address, said IP packet passes through said second H323 termination unit, said second network node apparatus, said more than one router inside said IP transfer network, said first network node apparatus and said first H323 termination unit, and reaches said first dependent IP telephone set;

when said first user hangs up a handset upon completion of telephone communication, an IP packet indicating the completion of telephone communication is formed/transmitted with a source IP address as being said first IP address and a destination IP address as being said second IP address;

when said IP packet passes through said first H323 termination unit, said first network node apparatus, said more than one router inside said IP transfer network, said second network node apparatus and said second H323 termination unit, and reaches said second dependent IP telephone set, thereby enabling said second user to acknowledge the completion of telephone communication.

15. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 14, wherein:

said second dependent type IP telephone set is directly connected via a communication line to another network node apparatus.

16. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 14, wherein:

plural sets of said second dependent type IP telephone sets are employed; and

said plural IP telephone sets are directly connected to each other via a communication line to another network node apparatus.

17. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein: dependent type voice/image apparatus 1 inquires a host name of dependent voice/image apparatus 2 to an IP image dedicated domain name server inside an IP transfer network via a media router 1 and obtains IP address of said dependent voice/image apparatus 2, then said dependent voice/image apparatus 1 sends voice/image data to said voice/image apparatus 2 via a media router 1, the IP transfer network and said media router 2, thereby to carry out a voice/image communication between said dependent voice/image apparatus 1 and said dependent voice/image apparatus 2.

18. A terminal-to-terminal communication connection control method with employment of an IP transfer network,

wherein: independent type voice/image apparatus 1 inquires a host name of independent voice/image apparatus 2 to an IP image dedicated domain name server inside an IP transfer network via a media router 1 and obtains IP address of said independent voice/image apparatus 2, then said independent voice/image apparatus 1 sends voice/image data to said voice/image apparatus 2 via a media router 1, the IP transfer network and said media router 2, thereby to carry out a voice/image communication between said independent voice/image apparatus 1 and said independent voice/image apparatus 2.

19. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

in order to perform a telephone communication between an analog IP telephone set 1 and an analog IP telephone set 2, when a handset of said analog IP telephone set 1 is taken up, such an analog signal for notifying a telephone call is transmitted from said analog IP telephone set 1; an H323 termination unit inside a media router detects an IP packet, and returns a response IP packet to said analog IP telephone set 1;

said analog IP telephone set 1 causes an IP packet containing the telephone number of said analog IP telephone set 2 to reach a network node apparatus connected to a media

router 1 via a communication line via said H323 termination unit 1 and the domain name server 1 inside said media router 1;

the network node apparatus 1 transmits said IP packet to a domain name server inside an integrated IP transfer network, and the domain name server 2 returns an IP address corresponding to the telephone number of said analog IP telephone set 2 in a 1-to-1 correspondence relationship via said domain name server 1 or without passing through said domain name server 1;

when said H323 termination unit 1 forms and sends an IP packet with an IP address in a 1-to-1 relationship with said analog IP telephone set as a source IP address and with said IP address 2 as being a destination IP address, said IP packet reaches another network node apparatus connected to said analog IP telephone set 2 via said network node apparatus 1 and more than one router inside IP transfer network, and is delivered to said H323 termination unit connected to a telephone set 2 inside another media router via a communication line;

when said user 1 starts a telephone call, said analog IP telephone set 1 sends an IP packet containing a voice sound expressed in digital form with a source IP address as being said IP address 1 and a destination IP address as being said IP address 2;

said IP packet passes through said H323 termination unit

1, said network node apparatus 1, more than one router inside said IP transfer network, the network node apparatus 2, and said H323 termination unit 2; and reaches said analog IP address 2.

20. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

said media router includes at least a domain name server, a router, a connection control unit, an H323 termination unit and an SCN interface;

said router can connect an IP terminal via an IP communication line;

said H323 interface can connect at least one of more than one dependent type IP telephone set and more than one dependent type IP voice/image apparatus via said IP communication line;

said SCN interface can connect more than one analog telephone via a telephone communication line;

an IP terminal, a dependent type IP telephone set, a dependent type IP voice/image apparatus, and an analog telephone set are connected via said media router to a network node apparatus; and

thereby to carry out an inter-terminal communication by obtaining an IP address corresponding to another network node apparatus or another network node apparatus connected to



the same network node apparatus.

21. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 20, wherein:

said media router does not include any one of said domain name server and said SCN interface, or both of said domain name server and said SCN interface.

22. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

an integrated IP transfer network contains at least two sets of an IP data network, an IP telephone network, an IP voice/image network, a best effort network, an IP data multicast network, an IP base TV broadcast network and a network node apparatus;

a network node apparatus is connected via a communication line to any of more than one said IP transfer network; and

a network node apparatus terminal of said network node apparatus is connected via a communication line to an external terminal of said integrated IP transfer network.

23. A terminal-to-terminal communication connection control method with employment of an IP transfer network,

wherein:

an IP terminal and a dependent type IP telephone set are connected via a communication line to a first gateway;

an IP terminal and an IP voice/image apparatus are connected via a communication line to a second gateway; and

the terminal-to-terminal communication can be established via said first gateway, said integrated IP transfer network, and said second gateway in order that the terminal-to-terminal communication can be made via said gateways.

24. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 1, wherein:

said media router is present within a CATV gateway employed in a CATV network, and is connected via a communication line to the network node apparatus provided in the integrated IP transfer network;

said media router is connected via any one of a CATV line interface and a CATV line to the IP terminal, the analog telephone set, the IP telephone set, and the IP voice/image apparatus; and

said CATV line contains a communication lower-grated layer specific to the CATV line, and owns a function capable of transferring an IP packet in a communication network.

25. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein: an IP terminal 1 provides a host name of an IP terminal 2 to a domain name server inside an integrated IP transfer network via CATV line and a CATV gateway, and obtains an IP address of an IP terminal 2, thereby to carry out inter-terminal communication between said terminals.

26. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein: an analog telephone set 1 provides a telephone number of an analog telephone set 2 to a domain name server inside an integrated IP transfer network via CATV line and a CATV gateway, and obtains an IP address of an analog telephone set 2, thereby to carry out inter-terminal communication between said telephone sets.

27. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein: a dependent type telephone set provides a telephone number of an analog telephone set to a domain name server inside an integrated IP transfer network via CATV line and a CATV gateway, and obtains an IP address of said analog telephone set, thereby to carry out inter-terminal communication between

said telephone sets.

28. A CATV gateway , wherein:

the CATV gateway includes a media router,

an IP terminal, an analog telephone set, dependent type IP telephone set, a dependent type voice/image apparatus are connected via a CATV line and a CATV interface,

an IP packet sent from said IP terminal, said analog telephone set, said dependent type IP telephone set, said dependent type voice/image apparatus are connected via a CATV line and a CATV interface is converted into an IP packet applied internal media router function and transferred to an IP transfer network, and

said IP packet received from said IP transfer network is sent to said IP terminal, said analog telephone set, said dependent type IP telephone set, said dependent type voice/image apparatus are connected via said media router.

29. A terminal receivable wireless apparatus, wherein:

the terminal receivable wireless apparatus contains an IP terminal, a dependent type telephone set, a dependent type IP voice/image apparatus, and has a function to communicate with another IP terminal, dependent type telephone set, dependent type IP voice/image apparatus via a wireless transmission/reception portion, a gateway, a network node

apparatus, an IP transfer network and another network node apparatus.

30. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

an IP terminal 1 is connected to an integrated IP transfer network via a terminal receivable wireless apparatus, a wireless communication path and a wireless transmission/reception section,

said IP terminal 1 provides a host name of an IP terminal 2 to a domain name server inside said IP transfer network and obtains an IP address of said IP terminal 2, and

thereby to carry out an inter-terminal communication between said IP terminals by sending data from said IP terminal 1 to said IP terminal 2.

31. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

a dependent type telephone set 1 is connected to an integrated IP transfer network via a terminal receivable wireless apparatus, a wireless communication path and a wireless transmission/reception section,

said IP terminal 1 provides a host name of a dependent

type telephone set 2 to a domain name server inside said IP transfer network and obtains an IP address of said dependent type telephone set 2, and

thereby to carry out an inter-terminal communication between said dependent type telephone sets by sending data from said dependent type telephone set 1 to said dependent type telephone set 2.

32. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

a dependent type voice/image apparatus 1 is connected to an integrated IP transfer network via a terminal receivable wireless apparatus, a wireless communication path and a wireless transmission/reception section,

said dependent type voice/image apparatus 1 provides a host name of dependent type voice/image apparatus to a domain name server inside said IP transfer network and obtains an IP address of dependent type voice/image apparatus 2, and

thereby to carry out an inter-terminal communication between said voice/image apparatuses by sending dependent type voice/image data from said dependent type voice/image apparatus 1.

33. A terminal-to-terminal communication connection

control method with employment of an IP transfer network as claimed in Claim 29, wherein:

both data of a DNS inquiry response format transmitted from said IP terminal and text data to be transmitted/received are converted into such data having an input data format of a wireless transmission/reception unit by a wireless interface converting unit, the converted data are inputted into a wireless transmission/reception unit and are sent via a wireless communication path to said wireless transmission/reception unit, and then said data are converted into such data having a data format of an IP packet which can be entered into a gateway in said wireless interface converting unit;

both telephone call control data sent out from said dependent type IP telephone set and digitally-expressed voice data to be transmitted/received are converted into data having an input data format of the wireless transmission/reception unit by said wireless interface converting unit, and the converted data are inputted to said wireless transmission/reception unit, and then are transmitted to said gateway via said wireless communication path, the wireless transmission/reception unit, the wireless interface converting unit, and also the communication line, while being converted into data having a data format of an IP packet which can be entered to said gateway; and

both call control data of a voice/image terminal sent out from said IP telephone set and digitally-expressed voice/moving image data to be transmitted/received are converted into data having an input data format of the wireless transmission/reception unit by said wireless interface converting unit, and the converted data are inputted to said wireless transmission/reception unit, and then are transmitted to said gateway via said wireless communication path, the wireless transmission/reception unit, the wireless interface converting unit, and also the communication line, while being converted into data having a data format of an IP packet which can be entered to said gateway.

34. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 23, wherein:

a plurality of gateway communication interface function units are provided inside said gateway, depending upon communication procedure, so that said gateway communication interface function units can be adapted to various sorts of telephone communication procedures.

35. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 34, wherein:



a telephone is connected to a media router provided in a LAN having a telephone number of a public switched telephone network;

a combination of an address telephone number and a transferee gateway telephone number is set in a transfer processing unit of a switching machine; and

said telephone is connected to another telephone machine inside said LAN.

36. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

an IP transfer network includes at least a network node apparatus, a telephone administration server, a media router, a telephone domain name server, and a table administration server;

a user "i" ("i" = 1, 2, ...) sets an individual external IP address to a media route of a user, located outside said IP transfer network, and one, or more telephone sets are connected to the media router of said user "i";

said media router is connected via a communication line to any of said network node apparatus, an internal IP address "IA-i" used to communicate with said user "i" is applied to a termination portion of said communication line on the side of the network node apparatus, and a telephone number specific

to a user is connected to said media router;

said telephone domain name server saves a set of the user individual telephone number, the external IP address "EA-i" of said media router and said internal IP address "IA-i";

when the user individual telephone number is inquired to the telephone domain name server, said telephone domain name server answers the external IP address and the internal IP address;

an IP communication record for determining an IP communication path between said media router and a pilot telephone administration server is set to said network node apparatus;

as a request of a ~~transmission~~-source telephone set, said IP communication record is employed, and said IP communication record is transferred via the pilot telephone administration server to a telephone administration server;

said telephone administration server requests said telephone domain name server to acquire both the external IP address and the internal IP address("EA-i,IA-i") of the transmission source media router from a ~~transmission~~-source telephone number, and both an external IP address and an internal IP address("EA-j, IA-j") of a destination media router from a destination telephone number;

while the telephone administration servers provided on both the transmission source side and the destination side

execute a series of procedures in combination with the media routers on the sides of the transmission source and the destination, and the telephone set, said table administration server sets said four IP addresses as an IP communication record between the transmission-source-sided network node apparatus and the destination network node apparatus and as another IP communication record between the ~~transmission-source~~ telephone set and the destination-sided telephone set; and

when the telephone communication is ended, said telephone administration server requests said table administration server to delete said IP communication records.

37. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 36, wherein:

when the telephone set on the transmission source side requests a telephone call setting operation, the telephone set on the transmission source side exclusively determines a ~~communication line identifier~~circuit identification code used to identify a communication line for telephone voice from a set of the destination telephone number and the ~~transmission~~ source telephone number;

the telephone administration server on the transmission source side transmits an IAM packet containing said ~~communication line identifier~~circuit identification code for

requesting the telephone call setting operation to the telephone administration server on the destination side;

the telephone administration server on the destination side returns an ACM packet for reporting the reception of said IAM packet to the telephone administration server on the transmission source side;

when the telephone set on the destination side produces a telephone call reception sound, the telephone management server on the destination side transmits a CPG packet for notifying a call reception to the telephone administration server on the transmission source side;

when the telephone set on the destination side responds to the call setting request, the telephone administration server on the destination side transmits an ANM packet indicative of a response to the call setting request to the telephone administration server on the transmission source side, and then, the telephone set on the transmission source side stops the calling sound thereby allowing to enter a communication phase;

when communication is completed and when a call-interrupting request is transmitted, the telephone administration server on the call-interrupting request said forms a REL packet requesting the completion of telephone communication using the ~~communication line identifier~~circuit identification code and transmits the REL packet to the

telephone administration server on the call-interrupted side;  
and

said telephone administration server on the call-interrupted side returns an acknowledgement reporting the reception of the REL packet.

38. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 36, wherein:

a payload portion of an IP packet is of UDP segments;

a telephone call connection phase and telephone release phase has only one port number;

a sole call control program to manage the connection phase and the telephone release phase is usable on different communication lines; and

a different voice from a different telephone set can be sent even if the media router is the only IP address by way of allocating a different UDP port number to each telephone set.

39. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 36, wherein:

in order that one telephone administration server may solo play the function of the transmission-sided telephone

administration server and the function of the reception-sided telephone administration server, said telephone administration server performs procedures of a telephone connection phase and a telephone release phase via the pilot telephone administration server is combination with a transmission source media router and a destination media router.

40. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 36, wherein:

said telephone administration server employs the communication company segment table of the telephone number in order to know as to whether the destination telephone number belongs to an IP telephone network operated/managed by the own communication company, or an IP telephone network operated/managed by another communication company.

41. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 36, wherein:

a telephone set having a destination telephone number employs a telephone administration server segment table of telephone numbers in order to know that the own telephone set joins to which network node apparatus.

42. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 36, wherein:

an operation administration server acquires a telephone communication record containing a ~~communication line identifier~~circuit identification code, a communication time instant, and a telephone number; and said operation administration server notifies the acquired telephone communication record to an operation administration server and a charging server so as to exclusively manage the network thereby to enhance the reliability of controlling the terminal-to-terminal communication connection.

43. A media router wherein:

more than two telephone sets are stored; voice inputted to an analog telephone set is digitalized by an analog interface unit to be sent to a media router major unit; voice entered into an IP telephone set is digitalized to be sent to the media router major unit; an IP packet on which the telephone voice is superimposed is transmitted from the media router major unit via a line interface unit to a network node apparatus of an IP transfer network; and said IP package is allocated with a telephone number of either of the telephone sets and with an address administration table.

44. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

an IP transfer network includes more than two network node apparatus;

a media router is connected to an IP communication line to any one of said network node apparatus;

an internal IP address is applied to a logic terminal of a termination unit on the side of said network node apparatus of the IP communication line;

an external IP address is applied to each of the media routers, and also said media router is connected via a communication line to more than one telephone set;

as a record of an address management table provided in said network node apparatus, both said external IP addresses and said internal IP addresses are contained, and an IP communication record for defining an IP capsulation method is previously set; and

a telephone communication connection control and a telephone communication release control are carried out between the telephone set connected to said media router and another telephone set connected to another media router.

45. A terminal-to-terminal communication connection



control method with employment of an IP transfer network as claimed in Claim 44, wherein:

a media router containing a telephone number server is employed, and said telephone number server answers an IP address when a telephone number is inquired.

46. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 44, wherein:

a telephone call connection phase is carried out by transmitting a call setting IP packet which contains at least a ~~transmission~~-source telephone number and a destination telephone number.

47. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 46 wherein:

a connection control of a telephone call identifier is attained by using a common port number for a plurality of telephone sets and individual voice communication in each telephone set is attained by allocating a different port number to each telephone set.

48. A terminal-to-terminal communication connection control method with employment of an IP transfer network

wherein: an inter-terminal communication for a telephone communication comprising call set, call set reception, call process and response is carried out by transmitting/receiving an IP packet inside IP transfer network and is moved to a service phase, and said service phase is completed by transmitting/receiving said IP packet via a step comprising release and release completion.

49. A media router wherein:

said media router includes a telephone number server which answers an IP address when a telephone number is inquired;

at an initial stage, the telephone number server is inquired to get an answer for the IP address and then a telephone call setting packet is formed by use of said IP address; and said IP address is transmitted to start the connection phase of telephone communication.

50. A media router as claimed in Claim 49 wherein:

at least a ~~transmission~~-source telephone number and a destination telephone number are contained inside a telephone call setting IP packet.

51. A media router as claimed in Claim 49 wherein:

said media router stores one, or more telephone sets, and contains one, or both functions of a PBX control unit and

a telephone control unit.

52. A media router as claimed in claim 49 wherein:

an IP packet voice/image transmitter/receiver, an IP terminal, or a communication line capable of transmitting/receiving an IP packet to/from a LAN can be connected to the media router.

53. A media router as claimed in claim 49 wherein:

a telephone call priority order control administration table is contained in said media router;

~~either a TCP segment or a transmission a source port~~  
number ~~of a UDP~~ contained in an IP packet is used, which is transmitted from a telephone set, or an IP terminal, or a moving image transmitter/receiver, connected ~~to the media router to~~ said media route; and

~~said IP packet TCP segment or transmission source port}~~  
is transmitted to a communication line on the network node apparatus side in the order of priority in accordance with the designation of the telephone call priority order control administration table.

54. A media router as claimed in claim 49 wherein:

a telephone call priority order control administration table is contained in said media router; and

while ~~a set of an~~ IP address and ~~either a TCP segment~~  
~~or a transmission source port number of a UDP either a TCP~~  
~~segment~~ contained in an IP packet is used, which is transmitted  
from a telephone set, ~~or an~~ IP terminal, or a moving image  
transmitter/receiver, which is connected ~~to the media router~~  
to said media router;

said ~~IP packet TCP segment or transmission source port~~  
is transmitted to a communication line on the network node  
apparatus side in the order of priority in accordance with the  
designation of the telephone call priority order control  
administration table.

55. A terminal-to-terminal communication connection  
control method with employment of an IP transfer network  
wherein:

an IP transfer network includes more than two network  
node apparatus;

a media router is connected to an IP communication line  
to any one of said network node apparatus;

an internal IP address is applied to a logic terminal  
of a termination unit on the side of said network node apparatus  
of the IP communication line;

an external IP address is applied to each of the media  
routers, and also said media router is connected via a  
communication line to more than one telephone set;

as a record of an address administration table provided in said network node apparatus, both said external IP addresses and said internal IP addresses are contained; and

an IP communication record is set in order that a telephone communication is carried out among preselected companies A-1, A-2, ..., A-N ("N" being larger than 2), so that a closed-area telephone communication can be carried out.

56. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 55 wherein:

a telephone set of the company A-1 which is connected to a closed-area telephone communication network which is effective among the preselected companies A-1, A-2, ..., A-N ("N" being larger than 2) can establish a telephone communication with a telephone set having an extension telephone number of the company A-1; and

telephone sets of the companies other than the company A-1 cannot establish telephone communications with the telephone set having the extension telephone number of the company A-1.

57. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

an IP transfer network includes more than two network node apparatus;

a media router is connected to an IP communication line to any one of said network node apparatus;

an internal IP address is applied to a logic terminal of a termination unit on the side of said network node apparatus of the IP communication line;

an external IP address is applied to each of the media routers, and also said media router is connected via a communication line to more than one telephone set;

as a record of an address administration table provided in said network node apparatus, both said external IP addresses and said internal IP addresses are contained, and an IP communication record for defining an IP capsulation method can be previously set; and

while more than one IP communication record is previously set which is supplied to a terminal-to-terminal communication within such a closed-area communication network for limiting a communication counter party, such an IP communication record which is supplied to a terminal-to-terminal communication not for previously limiting the communication counter party is newly set in a connection phase in response to a connection request among terminals, and thereafter is supplied to the terminal-to-terminal communication; and also said IP communication record is deleted.

58. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

in the closed-area telephone communication for limiting the communication counter party, the telephone number server contained in said media router, whereas in the closed-area telephone communication for not limiting the communication counter party, the telephone number server provided in the IP transfer network is used.

59. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

an IAM packet, an ACM packet, a CPG packet, an ANM packet, a REL packet, and a RLC packet are transmitted/received between the telephone administration server on the telephone calling side and the telephone administration server on the telephone reception side.

60. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 59 wherein:

after a response, a response confirmation is carried out; and a release acceptance is carried out between a release and

a release completion.

61. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

in an open-area telephone communication, a communication line employed in a voice communication can be separated from an IP communication line.

62. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

a telephone number server owns a CIC administration table, and can record a ~~transmission~~-source telephone number, a destination telephone number, a starting time instant of a telephone communication, and an end time instant thereof on said CIC administration table.

63. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

an operation administration server inquires a ~~transmission~~-source telephone number, a destination telephone number, a starting time instant of a telephone communication, and an end time instant thereof in order to use the acquired



items for charging operation.

64. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

a telephone calling line number administration is carried out.

65. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

a telephone call reception line number administration is carried out.

66. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 57 wherein:

the network node apparatus owns a function capable of separating an IP packet for a terminal-to-terminal communication connection from an IP packet for a voice communication, which are inputted outside the IP network; and

said network node apparatus synthesizes IP packets sent from the IP network to the network node apparatus to thereby send out the synthesized IP packet to the media router.

67. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

a relay exchanger of public switched network and a gateway 1 of IP transfer network is connected with NNI interface communication line;

a telephone set "TN-1" of telephone number "TN-1" connected to a subscriber exchanger "X1" of said public switched network is connected, as a telephone number "TN-1", to a media router connected to said transfer network;

when a telephone call connection is requested from a telephone set "T-2" of telephone number "TN-2" connected to a subscriber exchanger "X2" of said public switched network to telephone number "TN-1", said call connection request reached said subscriber exchanger "X1"; and

said call connection request reaches said telephone set "T-1" connected with said relay exchanger, said NNI interface communication line, said gateway 1, said IP transfer network and said media router due to receiving transfer function of said subscriber exchanger "X1".

68. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

a subscriber exchanger of public switched network and

a gateway 2 of IP transfer network is connected with UNI interface communication line;

a telephone set "TN-1" of telephone number "TN-1" connected to a subscriber exchanger "X1" of said public switched network is connected, as a telephone number "TN-1", to a media router connected to said transfer network;

when a telephone call connection is requested from a telephone set "T-2" of telephone number "TN-2" connected to a subscriber exchanger "X2" of said public switched network to telephone number "TN-1", said call connection request reached said subscriber exchanger "X1"; and

said call connection request reaches said telephone set "T-1" connected with said subscriber exchanger, said UNI interface communication line, said gateway 2, said IP transfer network and said media router due to receiving transfer function of said subscriber exchanger "X1".

69. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

in order to make a telephone communication from a telephone set which is connected to a public switched telephone network to another telephone set which is connected via an IP transfer network to ~~said another~~ public switched telephone network;

~~information of the input line information~~ supplied to the IP transfer network which is employed so as to connect a telephone communication line from said public telephone network to said IP transfer network is inquired to ~~a the internal gateway of said IP transfer network which contains line information, and is so as to be acquired, which contains internal line information of said IP transfer network while~~ a telephone number of a destination telephone set is used as a parameter; and

in this case, ~~said the~~ gateway containing said line information refers to an IP transfer network input line table thereof.

70. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

in order to make a telephone communication from a telephone set which is connected to a public switched telephone network to another telephone set which is connected via an IP transfer network to ~~another said~~ public switched telephone network;

~~information of the input line information~~ supplied to the IP transfer network which is employed so as to connect a telephone communication line from said public telephone network to said IP transfer network is inquired to the input

~~line information server a gateway which is provided outside~~  
~~of said IP transfer network, and is so as to be acquired, which~~  
~~contains external line information of said IP transfer network~~  
while a telephone number of a destination telephone set is used  
as a parameter; and

in this case, an input line information server refers  
to an IP transfer network input line table thereof.

71. A terminal-to-terminal communication connection  
control method with employment of an IP transfer network  
wherein:

in order to make a telephone communication from a  
telephone set which is connected to a public switched telephone  
network to another telephone set which is connected via an IP  
transfer network to ~~said another~~ public switched telephone  
network;

as ~~information of the output line information~~ supplied  
outside the IP transfer network which is employed so as to  
connect a telephone communication line from ~~said IP transfer~~  
~~network said public telephone network to said public telephone~~  
~~networks~~ ~~said IP transfer network~~, internal output line  
information of said IP transfer network is used while a  
telephone number of a destination telephone set is used as a  
parameter.

72. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

in order to make a telephone communication from a telephone set which is connected to a public switched telephone network to another telephone set which is connected via an IP transfer network to ~~said another~~ public switched telephone network;

~~external information of the output line information~~ supplied outside the IP transfer network which is employed so as to connect a telephone communication line from said IP transfer network ~~said public telephone network to said public telephone network~~ ~~said IP transfer network~~ is inquired to a ~~the internal gateway so as to be acquired, which is provided within of~~ said IP transfer network while a telephone number of a destination telephone set is used as a parameter; and ~~in this case, the said gateway inquires to~~ a telephone number server employed in the IP transfer network; and then said telephone number server responds thereto.

73. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in ~~any one of preceding claims 69 to 72~~ wherein:

~~said input line information of the said input line~~ supplied to the IP transfer network corresponds to information

~~of accessing information~~ obtained via an NNI ~~or a UNI~~ communication line; and ~~information of the~~ output line ~~information~~ supplied outside the IP transfer network corresponds to ~~access~~ ~~information of accessing~~ ~~obtained via~~ an NNI ~~or a UNI~~ communication line.

74. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in ~~any one of preceding claims 69 70 to 72~~ wherein:  
~~information of said input line information~~ supplied to the IP transfer network corresponds to ~~information of accessing~~ ~~information obtained via an NNI or a UNI~~ communication line; and ~~information of the~~ output line ~~information~~ supplied outside the IP transfer network corresponds to ~~access~~ ~~information of~~ ~~accessing~~ ~~obtained via an NNI or a UNI~~ communication line.

75. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in ~~any one of preceding claims 69 to 72~~ Claim 71 wherein:  
~~information of the said input line information~~ supplied to the IP transfer network corresponds to ~~information of~~ ~~accessing~~ ~~information obtained via an NNI or a UNI~~ communication line; and ~~the information of said output line~~ ~~information~~ supplied outside the IP transfer network corresponds to ~~access~~ ~~information of~~ ~~accessing~~ ~~obtained via~~

an NNI or a UNI communication line.

76. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in ~~any one of preceding claims 69 to~~ Claim 72 wherein:

information of the said input line information supplied to the IP transfer network corresponds to information of accessing information obtained via a UNI communication line; and ~~the information of said output line information~~ supplied outside the IP transfer network corresponds to ~~access~~ information of accessing ~~obtained~~ via an NNI communication line.

77. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 69 ~~or 70~~ wherein:

the gateway containing the line information is identified from a exchanger of the public switched telephone network based upon a ~~signal station point~~ code.

78. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

a communication line for a telephone communication connection control is separated from a voice communication line



between a termination gateway equipped with an encapsulation function and a relay gateway; and

a telephone communication is carried out between two telephone sets via a telephone set 1, a termination gateway equipped with a capsulation function, a relay gateway, an NNI interface communication line, a public switched telephone network, and a telephone set 2 in this order.

79. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 78 wherein:

a telephone number server employed in said termination gateway equipped with the encapsulation function, and a relay control unit employed in the relay gateway own individual CIC administration tables; and ~~execute-manage~~ circuit identification codes line numbers by employing the respective CIC administration tables.

80. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 78 wherein:

the relay control unit retrieves a signalling point ~~station~~-address administration table and indicates a telephone number of a destination telephone set so as to acquire a signalling point~~station~~ address of such a exchanger for

managing said destination telephone set.

81. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 78 wherein:

the relay control unit determines a ~~line number~~circuit identification code and a signalling link selection based upon a rule which is previously determined with respect to the public switched telephone network.

82. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 78 wherein:

a conversion between an IP packet and a signalling unit is carried out by employing an address connection table employed in the relay control unit within the relay gateway, which holds address information contained in an IP packet and label information contained in a signalling unit.

83. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 78 wherein:

while using a media connection table contained in a voice control unit provided in the relay gateway, a converting operation between an IP packet for storing digital voice, and

a voice signal which is transferred through a voice communication line of the NNI communication line is carried out.

84. A relay control unit wherein:

in the method claimed in Claim 78, while using an address connection table which contains both address information contained in an IP packet and label information contained in a signalling unit, a conversion operation between the IP packet and the signalling unit is carried out.

85. A voice control unit wherein:

in the method claimed in Claim 78, while a media path connection table, the voice control unit performs a conversion operation between an IP packet for storing digital voice, and a voice signal transferred through a voice communication line of an NNI communication line.

86. A voice control unit as claimed in claim 85, wherein:

said voice control unit has an IP address used to transmit/receive a voice IP packet, and said IP address is supplied to set a media path communication table.

87. A voice control unit as claimed in Claim 85, wherein:

said voice control unit secures a logic voice

communication line used to receive or transmit from the public switched telephone network.

88. A termination gateway equipped with a capsulation function wherein:

said termination gateway equipped with the encapsulation function includes a relay control unit and a network node apparatus;

said network node apparatus owns both an IP encapsulation function and an inverse-capsulation function;

said relay control unit includes a telephone administration server, a telephone number server, a pilot telephone server, and a table administration server; and

among IP packets entered from a media router to the network node apparatus, a telephone call control IP packet is transferred to the relay control unit, and a voice IP packet is branched to a voice IP communication line.

89. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

a telephone communication between two telephone sets can be carried out via a telephone set 1, a public switched telephone network 1, an NNI interface communication line, both a relay gateway 1 and a relay gateway 2, which belong to an

IP transfer network, an NNI interface communication line 2, a public switched telephone network, and a telephone set 2 in this order.

90. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

a telephone communication between two telephone sets can be carried out via a telephone set, a public switched telephone network 1, an NNI interface communication line, both a relay gateway and a gateway equipped with a capsulation function, which belong to an IP transfer network, a media router, and a telephone set 2 in this order.

91. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

a telephone communication between two telephone sets can be carried out via a telephone set 1, a media router, both a relay gateway and a gateway equipped with a non-capsulation function, which belong to an IP transfer network, an NNI interface communication line, a public switched telephone network, and a telephone set 2 in this order.

92. A terminal-to-terminal communication connection

control method with employment of an IP transfer network as claimed in claim 91 wherein:

based upon an address administration table contained in a non-capsulation type termination gateway, such an IP packet filtering operation is carried out, through which only an IP packet may pass into which a set of an IP address and a port number has been registered.

93. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in claim 91 wherein:

based upon an address administration table contained in a non-capsulation type termination gateway, such an IP packet filtering operation is carried out, through which only an IP packet may pass into which a port number has been registered.

94. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

a telephone communication can be carried out between two telephone sets via a telephone set 1, a media router 1, and both a termination gateway equipped with an encapsulation function and a relay gateway, which belong to an IP transfer network 1, and also via both another relay gateway and another termination gateway equipped with an encapsulation function,

which belong to an IP transfer network 2, a media router 2, and a telephone set 2 in this order.

95. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

a telephone communication can be carried out between two telephone sets via a telephone set 1, a media router 1, and both a termination gateway equipped with a non-capsulation function and a non-capsulation relay gateway, which belong to an IP transfer network 1, and also via both another relay gateway and another termination gateway equipped with a non-capsulation function, which belong to an IP transfer network 2, a media router 2, and a telephone set 2 in this order.

96. A terminal-to-terminal communication connection control method with employment of an IP transfer network wherein:

in a case of inputting an IP packet receiving relay control section Y of IP transfer network Y from IP transfer network X which is operated by a communication company X to IP transfer network Y which is operated by a communication company Y;

when said IP packet is received, said relay control section Y inquires for a telephone number server and obtains

an IP address of another relay control section Z of IP transfer network which relates to a connection for a receiver telephone number including in said IP packet; and

an IP packet set said obtained IP address is transferred to another relay control section Z.

97. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 9, wherein:

a network node apparatus has a first function to encapsulate an external IP packet and to form an internal IP packet and a second function to restore said external IP packet by ~~inverse-encapsulating~~ said internal IP packet;

said encapsulation and ~~inverse-decapsulation~~ are held as a record of an address administration table; and

address of a terminal is included in said address administration table.

98. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 10, wherein:

a network node apparatus has a first function to encapsulate an external IP packet and to form an internal IP packet and a second function to restore said external IP packet by ~~inverse-encapsulating~~ said internal IP packet;



said encapsulation and ~~inverse-decapsulation~~ are held  
as a record of an address administration table; and  
address of a terminal is included in said address  
administration table.

99. A terminal-to-terminal communication connection  
control method with employment of an IP transfer network as  
claimed in Claim 9, wherein:

information of multicast receiver provider and  
information multicast service buyer are received via user  
service server, thereby to utilize to set a multicast tree  
structure.

100. A terminal-to-terminal communication connection  
control method with employment of an IP transfer network, as  
claimed in Claim 9, wherein:

said multicast tree structure server inquires connection  
information and communication line cost due to said network  
node apparatus and a communication line between said routers  
to a resource administration server and obtains responses  
therefrom, and thereby to utilize to set said multicast tree  
structure.

101. A terminal-to-terminal communication connection  
control method with employment of an IP transfer network, as

claimed in Claim 9, wherein:

said multicast tree structure server notifies an address additional information for an address administration table inside said network node apparatus and an additional information for a path table inside said router to plural table administration server, and thereby to set said multicast tree structure.

102. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 9, wherein:

multicast communication record is set at said path tables of respective routers; and

an address administration table additional information and a path table additional information for tree structure set of multicast service are transferred from said tree structure server to a table administration server by utilizing said multicast communication record.

103. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 9, wherein:

a multicast proxy server individually communicates with a terminal connected to a network node apparatus; and

a high accuracy multicast is realized by sending

multicast data.

104. A terminal-to-terminal communication connection control method with employment of an IP transfer network as claimed in Claim 9, wherein:

when an IP packet including a multicast IP packet as a receiver address is detected;

said IP packet is abandoned; and

thereby to exclude an IP packet concentration for the receiver.

105. A network node apparatus as claimed in Claim 11, wherein:

an IP packet is transferred to an overflow communication line when an internal packet output designation in the communication record is not designated in IP capsulation.

106. A multicast cable voice broadcast communication system, wherein:

digitalized voice is transferred from a voice transmittance terminal and plural digitalized voice reception terminal receive said digitalized voice.

107. A cable TV communication system, wherein:

digitalized voice is transferred from a voice/moving image transmittance terminal and plural digitalized

voice/moving image reception terminal receive said digitalized voice/moving image.

108. A multicast communication system with employment of an IP transfer network, wherein:

an IP transfer network has one network node apparatus or more,

said network node apparatus has a first function to form an internal IP packet by encapsulating an external IP packet inputting from said IP transfer network and a second function to restore to said external IP packet and output to outside by ~~inverse-encapsulating~~ said internal IP packet,

said internal IP packet is transferred in said IP transfer network passing one or more router having multicast function,

one or more terminal connected to said network node apparatus via IP communication line has peculiar external IP address and has one or more multicast IP address defined for respective multicast services,

multicast data sent from terminal of multicast sending side is transferred in said IP transfer network, and

said terminal is capable of receiving one or more multicast services by sending said multicast data to said terminal.

109. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein:

a terminal at receiving side optionally provides multicast IP address for respective multicast services by requesting to an IP transfer network operator, or cancels said multicast IP address.

110. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein one multicast service proxy server or more is connected to said network node apparatus.

111. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein:

a multicast service proxy server sends ACK packet intensive information, NACK packet intensive information and IP packet including intensive information of respective terminals to a carrying out the multicast service or to a sending work server; and

said ACK packet is received one terminal or more connected to said network node apparatus.

112. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein: a multicast service proxy server could communicate with a sending

terminal or a sending work server which carries on the multicast service connected to said multicast service proxy server.

113. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein: a multicast service proxy server receives multicast data sent from an originating terminal and stores therein; and said multicast service proxy server sends said stored data to a terminal connected to said network node apparatus connecting with multicast service proxy server by using a multicast function of said network node apparatus.

114. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein: said multicast service proxy server could communicate with a specific terminal set communication code at said network node apparatus by transmitting/receiving said IP packet.

115. A multicast communication system with employment of an IP transfer network as claimed in Claim 108, wherein:

an internal IP packet is in communication code to designate a method for an IP-encapsulation and an IP-inverse-decapsulation;

when said internal IP packet output designating value is designated, said IP-encapsulation is carried out,

when said internal IP packet output designating value is not designated, said IP-encapsulation is not carried out and outputs an external IP packet to an external IP packet overflow communication line.

116. A multicast communication system with employment of an IP transfer network as claimed in Claim 115, wherein:

an overflow communication line server receives an external IP packet not being IP-encapsulated via said external IP packet overflow communication line, and transfers information included in said external IP packet to said multicast service proxy server via said network node apparatus.

117. A multicast communication system with employment of an IP transfer network as claimed in Claim 115, wherein:

an overflow communication line server receives an external IP packet not being IP-encapsulated via said external IP packet overflow communication line, and transfers information included in said external IP packet to said multicast service proxy server via a communication line connected to said overflow communication line server and said multicast service proxy server.

118. A network node apparatus, wherein;

an internal IP packet is in communication code to

designate a method for an IP-encapsulation and an IP-inverse-decapsulation;

when said internal IP packet output designating value is designated, said IP-encapsulation is carried out,

when said internal IP packet output designating value is not designated, said IP-encapsulation is not carried out and outputs an external IP packet to an external IP packet overflow communication line.

119. A network node apparatus, wherein;

said network node apparatus has a first function to form an internal IP packet by IP-encapsulating an external IP packet and a second function to restore said external IP packet by inverse-decapsulating said internal IP packet;

an internal IP packet is in communication code to designate a method for an IP-encapsulation and an IP-inverse-decapsulation;

when said internal IP packet output designating value is designated, said inverse-IP-decapsulation is carried out, and

when said internal IP packet output designating value is not designated, said inverse-IP-decapsulation is not carried out and outputs an external IP packet to an external IP packet overflow communication line.



120. A network node apparatus as claimed in Claim 118, wherein; further including an overflow IP packet selecting functional section to connect to said external IP packet overflow communication line.

121. A multicast communication system with employment of an IP transfer network, wherein:

sender multicast addresses are registered at an address administration table of a network node apparatus;

said IP packet is transferred when a sender multicast address in a header inputting to said network node apparatus is registered at said address administration table;

said IP packet is abandoned when said sender multicast address is not registered;

thereby to prevent that an unexpected IP packet intermixes with the IP transfer network.

122. A multicast communication system with employment of an IP transfer network ~~as claimed in Claim 121~~, wherein:

originating IP addresses are registered at an address administration table of a network node apparatus;

~~said the~~ IP packet inputted to said network node apparatus is transferred when an originating IP address in a header ~~inputting to said network node apparatus~~ is registered at said address administration table;

said IP packet is abandoned when said originating IP address is not registered;

thereby to prevent that an unexpected IP packet intermixes with the IP transfer network.

123. A network node apparatus, wherein:

an IP packet is transferred when an IP address of a terminal is registered at an address administration table; and

when said IP address is not registered, that unexpected IP packet intermixes with the IP transfer network is prevented by transferring said IP packet to an overflow communication line.

124. A multicast communication system with employment of an IP transfer network ~~as claimed in Claim 121~~, wherein:

sender multicast addresses are registered at a network node apparatus path table;

~~said the~~ IP packet is transferred when a sender multicast address in a header of an external IP packet ~~inputting-inputted~~ to said network node apparatus is registered at said network node apparatus path table;

said IP packet is abandoned when said sender multicast address is not registered;

thereby to prevent that unexpected IP packet intermixes with the IP transfer network.

125. A network node apparatus, wherein:

sender multicast addresses are registered at a path table;

said IP packet is transferred when a sender multicast address in a header of an external IP packet inputting to said network node apparatus is registered at said path table;

said IP packet is abandoned when said sender multicast address is not registered;

thereby to prevent that unexpected IP packet intermixes with the IP transfer network.

126. A multicast communication system with employment of an IP transfer network as claimed in Claim 124, wherein:

a multicast service proxy server receives multicast data sent from a sender's terminal and stores it therein; and

said multicast service proxy server outputs said stored multicast data to a terminal connected to said network node apparatus connecting said multicast service proxy server by using a multicast function of said network node apparatus.

127. A multicast communication system with employment of an IP transfer network as claimed in Claim 124, wherein:

said multicast service proxy server sends an ACK packet intensive information received from one or more terminals

connected to said network node apparatus, an IP packet including an NACK packet intensive information and an intensive information of individual terminal to a sending terminal carrying out a multicast service or to a sending work server.

128. A multicast communication system with employment of an IP transfer network as claimed in Claim 122-~~or 124~~, wherein:

said multicast service proxy server could communicate with a sending terminal carrying out a multicast service connected by said multicast service proxy server or with a sending work server by transmitting/receiving said IP packet.

1298b. A multicast communication system with employment of an IP transfer network as claimed in Claim 124, wherein:

said multicast service proxy server could communicate with a sending terminal carrying out a multicast service connected by said multicast service proxy server or with a sending work server by transmitting/receiving said IP packet.

13029. A multicast communication system with employment of an IP transfer network as claimed in any one of Claims 124 to 126, wherein: said multicast service proxy server uses an information included in said IP packet received via said IP packet overflow communication line.

1310. A cable voice broadcast communication system as claimed in Claim 122-~~er~~-124, wherein: said sending terminal sends digitalized voice, and plural receiving terminals receive said digitalized voice.

132. A cable voice broadcast communication system as claimed in Claim 131, wherein: said multicast proxy server intermediates an information exchange between the sending terminal and the receiving terminal.

1330b. A cable voice broadcast communication system as claimed in Claim 124, wherein: said sending terminal sends digitalized voice, and plural receiving terminals received said digitalized voice.

~~131. A cable voice broadcast communication system as claimed in Claim 130, wherein: said multicast proxy server intermediates an information exchange between the sending terminal and the receiving terminal.~~

1342. A cable voice broadcast communication system as claimed in Claim ~~130~~1330b, wherein: ~~said multicast proxy server and said sending work terminal intermediate said multicast proxy server~~ intermediates an information exchange between the sending terminal and the receiving terminal.

1353. A cable TV broadcast communication system as claimed in Claim 122 ~~or 124~~, wherein: said sending terminal sends digitalized voice/moving image, and plural receiving terminals receive said digitalized voice/moving image.

136. A cable TV broadcast communication system as claimed in Claim 135, wherein: said multicast proxy server intermediates an information exchange between the sending terminal and the receiving terminal.

1373b. A cable TV broadcast communication system as claimed in Claim 124, wherein: said sending terminal sends digitalized voice/moving image, and plural receiving terminals receive said digitalized voice/moving image.

~~134. A cable TV broadcast communication system as claimed in Claim 133, wherein: said multicast proxy server intermediates an information exchange between the sending terminal and the receiving terminal.~~

1385. A cable TV broadcast communication system as claimed in Claim 1373b, wherein: ~~said multicast proxy server and said sending work terminal intermediate said multicast proxy server intermediates~~, an information exchange between the sending

terminal and the receiving terminal.

1326. A multicast communication system with employment of an IP transfer network, wherein:

a terminal is connected to a router connecting an address administration module via a communication line;

a sender's IP address is registered at an address administration table of said address administration module;

said IP packet is transferred when said sender's address in a header of an IP packet inputting to said router is not registered at said address administration table;

said IP packet is abandoned when said sender's address is not registered;

thereby to prevent that an unexpected IP packet intermixes with an IP transfer network.

14037. A multicast communication system with employment of an IP transfer network, wherein:

a terminal is connected to a router connecting an address administration module via a communication line;

a sender's IP address is registered at an address administration table of said address administration module;

said IP packet is transferred when said sender's address in a header of an IP packet inputting to said router is not registered at said address administration table;

said IP packet is transferred to an overflow communication line when said sender's address is not registered;

thereby to prevent that an unexpected IP packet intermixes with an IP transfer network.

14138. A multicast communication system with employment of an IP transfer network, wherein:

an IP transfer network includes one or more routers;  
said routers are connected to an IP communication line;  
a terminal is connected to a router connecting an address administration module via a communication line;

an IP address is registered at an address administration table of said address administration module;

said IP packet is transferred when said sender's address in a header of an IP packet inputting to said router is not registered at said address administration table;

said IP packet is abandoned when said sender's address is not registered;

thereby to prevent that an unexpected IP packet intermixes with an IP transfer network.

14239. A multicast communication system with employment of an IP transfer network, wherein:

a multicast service provider sends multicast data to a



first sending work server operated by a communication company X and a second sending work server operated by a communication company Y;

said first sending work server sends said multicast data to plural terminals connected with a first IP transfer network operated by said communication company X; and

said second sending work server sends said multicast data to plural terminals connected with a second IP transfer network operated by said communication company Y.

1430. A multicast communication system with employment of an IP transfer network as claimed in Claim 14239, wherein:

said first sending work server collects sent results in said first IP transfer network via a multicast service proxy server so as to notify to said multicast service provider; and

said second sending work server collects sent results in said second IP transfer network via said multicast service proxy server so as to notify to said multicast service provider.

144. A terminal-to-terminal communication connection control method with employment of an IP transfer network, wherein:

an IP transfer network contains two, or more connection servers, and a media router outside said IP transfer network is connected to a terminal having a transmittance/reception

function of digital media:

\_\_\_\_\_ a call setting IP packet is transmitted from said media router to the connection servers:

\_\_\_\_\_ said connection server provided on the telephone calling side determines both a communication line for an inter-terminal communication within said IP transfer network and a circuit identification code for identifying said communication line by employing both a telephone number provided on the telephone calling side and a telephone number provided on the call reception side, and produces an initial address message containing said circuit identification code:

\_\_\_\_\_ said produced initial address message is transmitted to the connection server provided on the call reception side via a relay connection server, said connection server on the call reception side transmits a call setting IP packet to the media router on the call reception side, and said media router on the call reception side transmits said call setting IP packet to the terminal on the call reception side:

\_\_\_\_\_ said connection server on the call reception side produces an address completion:

\_\_\_\_\_ said address completion message and transmits said received address completion message is transmitted to said connection server on the telephone calling side via said relay connection server:

\_\_\_\_\_ when a report of telephone calling operation is received

from the terminal on the call reception side, said connection server on the call reception side produces a call pass message; said call pass message reaches via said relay connection server to said connection server on the telephone calling side; and said connection server on the calling side transmits the report of telephone calling operation of the terminal on the call reception side to the media router on the telephone calling side;

\_\_\_\_\_ upon receipt of a response issued from the terminal on the call reception side, said connection server on the call reception side produces a response message; said response message reaches via said relay connection server to said connection server on the telephone calling side; said connection server on the telephone calling side stops the calling sound of the terminal on the call reception side; both said terminal on the telephone calling side and said terminal on the call reception side can establish an inter-terminal communication between the terminals to transmit/receive the digital media via said media routers provided on the telephone calling side and the call reception side;

\_\_\_\_\_ a request for interrupting the inter-terminal communication is transmitted from said media router provided on either the telephone calling side or the call reception side to said connection server; a release request is sent from said connection server to both said relay connection server and

another connection server; an interrupt instruction is transmitted from said another connection server to another media router, and on the other hand, a release completion is transmitted from another connection server via said relay connection server to said server; and an interrupt completion is sent to a media router so as to connect/release the inter-terminal communication between the two terminals.

144. A terminal to terminal communication control method with employment of an IP transfer network, wherein:

an IP transfer network contains two, or more connection servers, and a media router outside said IP transfer network is connected to a terminal having a transmittance/reception function of digital media;

a call setting IP packet is transmitted from said media router to the connection servers;

said connection server provided on the telephone calling side determines both a communication line for an inter-terminal communication within said IP transfer network and a line number/circuit identification code for identifying said communication line by employing both a telephone number provided on the telephone calling side and a telephone number provided on the call reception side, and produces an initial address message containing said line number/circuit identification code;

~~\_\_\_\_\_ said produced initial address message is transmitted to the connection server provided on the call reception side, said connection server on the call reception side transmits a call setting IP packet to the media router on the call reception side, and said media router on the call reception side transmits said call setting IP packet to the terminal on the call reception side;~~

~~\_\_\_\_\_ said connection server on the call reception side produces an address completion;~~

~~\_\_\_\_\_ said address completion message and transmits said received address completion message is transmitted to said connection server on the telephone calling side;~~

~~\_\_\_\_\_ when a report of telephone calling operation is received from the terminal on the call reception side, said connection server on the call reception side produces a call pass message; said call pass message reaches to said connection server on the telephone calling side; and said connection server on the calling side transmits the report of telephone calling operation of the terminal on the call reception side to the media router on the telephone calling side;~~

~~\_\_\_\_\_ upon receipt of a response issued from the terminal on the call reception side, said connection server on the call reception side produces a response message; said response message reaches to said connection server on the telephone calling side; said connection server on the telephone calling~~

~~side stops the calling sound of the terminal on the call reception side; both said terminal on the telephone calling side and said terminal on the call reception side can establish an inter-terminal communication between the terminals to transmit/receive the digital media via said media routers provided on the telephone calling side and the call reception side;~~

~~\_\_\_\_\_ a request for interrupting the inter-terminal communication is transmitted from said media router provided on either the telephone calling side or the call reception side to said connection server; a release request is sent from said connection server to another connection server; an interrupt instruction is transmitted from said another connection server to another media router, and on the other hand, a release completion is transmitted from another connection server via said relay connection server to said server; and an interrupt completion is sent to a media router so as to connect/release the inter-terminal communication between the two terminals.~~

145. A connection method for connecting PSTN with an IP network by using a common channel signalling system, wherein control lines for line connection and communication lines are separated in said IP network.

146. A network connection apparatus having a function to connect PSTN with an IP network by using a common channel

signalling system, and having connection a control line interface and a communication line interface at side of said IP network.

147. An IP network, wherein control lines and communication lines for communications between terminals are logically separated inside of said IP network, said control lines and communication lines are connected to network node apparatus, line connection control between said terminals is carried out by using a common channel signalling system, through said network node apparatus.

148. An IP network as claimed in Claim 147, wherein said network nodes are connecting apparatus, said network nodes include connection control line interface and communication line interface at side of said IP network and said IP network has a function to connect PSTN with said IP network by using said common channel signalling method.



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Appendix B

VERSION WITH MARKINGS TO SHOW CHANGES MADE)

Please amend the Abstract as follows:



ABSTRACT OF THE DISCLOSURE

Both a connection server and a relay connection server are installed in an IP transfer network; a function similar to a line connection control of a subscriber exchanger is applied to a connection server; a function similar to a line connection control of a relay exchanger is applied to the relay connection server; and a terminal-to-terminal communication connection control method with using the IP transfer network is realized in such a manner that a telephone set and a terminal such as an IP terminal and a video terminal transmit/receive an initial address message, an address completion message, a call pass message, a response message, a release message and a release completion message, which can be made in a 1-to-1 correspondence relationship with line connection control messages of the common line channel signalling system. Furthermore, while an address administration table is set to a network node apparatus of an IP transfer network, means for registering addresses of the terminals into ~~the~~ address administration table is employed, so that an IP packet communication by a multicast manner can be realized with improving information security performance.